

LESSON 89

1. A) false; A line has no endpoints.
B) false; Any three points are coplanar.
C) true
D) false; Only acute angles have complements.
E) false; All equilateral triangles are isosceles.
G) true
2. $(5x - 4)^\circ$ and the angle to the right of 64° are corresponding angles and must be congruent.
 $5x - 4 = 180 - 64; x = 24$
3. D
4. interior angle sum = $180(n - 2) = 180(5 - 2) = 540^\circ$
one interior angle = $540/5 = 108^\circ$
5. A) false; Dilations produce similar figures.
B) true; Dilations produce similar figures.
C) false; $DE = 2AB$
D) true; Reflections and dilations preserve angles.
6. An angle bisector creates two congruent angles.
 $m\angle ABP = m\angle PBC$
 $3x + 7 = 5x - 9; x = 8$
 $m\angle ABC = 2m\angle ABP = 2(3x + 7) = 2(31) = 62^\circ$
7. The translation maps $P(3, -4)$ to $P'(2, 1)$.
The reflection maps $P'(2, 1)$ to $P''(1, 2)$.
So, the final image is $(1, 2)$.
8. A) parallelogram; Opposite angles are congruent.
B) parallelogram; Diagonals bisect each other.
C) parallelogram; Opposite sides are congruent.
D) not a parallelogram
9. 2. Segment Addition Postulate
4. Subtraction Property
10. D
11. Corresponding sides must be proportional.
 $\frac{24}{18} = \frac{16}{x} \rightarrow 24x = 18(16) \rightarrow x = 12$
 $\frac{24}{18} = \frac{28}{y} \rightarrow 24y = 18(28) \rightarrow y = 21$
12. The sum of two sides of a triangle must be greater than the third side. Let x be the third side.
 $x + 5 > 9 \quad x + 9 > 5 \quad 5 + 9 > x$
 $x > 4 \quad x > -4 \quad x < 14$
Combine the three inequalities to get $4 < x < 14$.
13. A midsegment is half the length of the third side, so the perimeter of $\triangle PQR$ is half the perimeter of $\triangle ABC$.

14. B, C, D
15. Corresponding angles are congruent.
 $m\angle G = m\angle E = 75^\circ$
Angles in a triangle add up to 180° .
 $m\angle 1 = 180 - m\angle G - m\angle H = 180 - 75 - 55 = 50^\circ$
16. C, B, D, A
17. Base angles of an isosceles triangle are congruent.
 $2x = 5x - 45; x = 15$
base angle = $2(15) = 30^\circ$
Angles in a triangle add up to 180° .
vertex angle = $180 - 2(30) = 120^\circ$
18. Non-vertex angles are congruent.
 $m\angle 1 = 113^\circ$
Angles in a triangle add up to 180° .
 $m\angle 2 = 180 - 27 - 113 = 40^\circ$
19. C; $\cos 38^\circ = x/13$, not $13/x$.
20. The altitudes are \overline{BA} , \overline{BC} and \overline{BF} .
The orthocenter is B .
 \overline{AE} and \overline{BD} are medians. G is the centroid.
21. 2. Def. of bisect (or def. of segment bisector)
3. Vertical angles are congruent.
4. SAS
22. B is similar by SSS.
C is similar by AA.
23. T is the centroid and divides \overline{AD} in the ratio 2:1.
 $AD = 3TD = 3(6) = 18$
 $AT = 2TD = 2(6) = 12$
24. Use the Altitude Rule [68.1].
 $x^2 = 14(8) = 112$
 $x = 4\sqrt{7}$
25. Use a 45-45-90 triangle. Use a 30-60-90 triangle.
 $a = 3$ $c = 3\sqrt{3}$
 $b = 3\sqrt{2}$ $d = 2(3) = 6$
26. A) true; Bases are parallel.
B) true; Legs are congruent.
C) false; Diagonals are not necessarily perpendicular.
D) true; Diagonals are congruent.

27. Angles in a triangle add up to 180° .

$$90 + 2x + (3x - 10) = 180; x = 20$$

$$m\angle B = 2(20) = 40^\circ$$

$$m\angle C = 3(20) - 10 = 50^\circ$$

- A) false; $AC < AB$ because $m\angle B < m\angle C$.
B) false; $AB + AC > BC$ by Theorem 52.3.
C) false; $\angle B$ is smallest, so \overline{AC} is shortest.
D) true; $\angle A$ is largest, so \overline{BC} is longest.
E) true
28. Consecutive angles of a parallelogram are supplementary, so $x + 5x = 180$ and $x = 30$.
Opposite angles of a parallelogram are congruent, so the parallelogram has angles 30° , 150° , 30° , and 150° .

29. $\frac{1.6}{x} = \frac{2.4}{12} \rightarrow 2.4x = 1.6(12) \rightarrow x = 8$

The tree is 8 meters tall.

30. $\theta = 35^\circ$

$$x = 80 / \tan 35^\circ \approx 114.3$$

The ship is about 114.3 ft away from the lighthouse.

